

TWO-DIMENSIONAL BLAZED MEMS GRATING

ABSTRACT OF THE DISCLOSURE

A method for assuring a blazed condition in a DMD device used in telecommunications applications. By meeting certain conditions in the fabrication and operation of the DMD, the device can achieve a blazed condition and be very effective in switching near monochromatic spatially coherent light, thereby opening up a whole new application field for such devices. This method determines the optimal pixel pitch and mirror tilt angle for a given incident angle and wavelength of near monochromatic spatially coherent light to assure blazed operating conditions. The Fraunhofer envelope is determined by convolving the Fourier transforms of the mirror aperture and the delta function at the center of each mirror and then aligning the center of this envelope with a diffraction order to provide a blazed condition. The method of the present invention presents a formula for precisely determining the mirror pitch and tilt angle to assure that a blazed condition exists for a given incident angle and wavelength of near monochromatic spatially coherent light. Considerations for the special case, know as Littrow conditions, where the incident and the reflected light transverse the same path, are also given. This case is particularly attractive for fiber optic/telecommunication applications since the same optics can be used for incoming and outgoing (reflected) light.